

**CLAIMS**

1. A rack and pinion steering gear for a vehicle, the steering gear comprising a housing, a pinion rotatable about a first axis in the housing, a rack laterally displaceable with respect to the housing, an intermediate gear interposed between,  
5 and meshing with, the pinion and with the rack, the intermediate gear rotatable about a second axis, characterised in that the second axis is laterally movable with respect to the housing as a function of at least one vehicle parameter, by an actuator mechanism, thereby varying the relationship between the angular  
10 displacement of the pinion and the lateral displacement of the rack as a function of the vehicle parameter.
2. A rack and pinion steering gear as claimed in claim 1 wherein the second axis is eccentric with respect to the central axis of the intermediate gear.
- 15 3. A rack and pinion steering gear as claimed in claim 1 wherein the second axis is also the central axis of the intermediate gear.
4. A rack and pinion steering gear as claimed in claim 1 wherein the actuator  
20 mechanism comprises a linkage, the linkage maintaining a fixed distance between the second axis and a third axis when the axial load exerted on the linkage is less than a predefined value.
5. A rack and pinion steering gear as claimed in claim 4 wherein the third axis is fixed  
25 with respect to a crank and offset from its axis of rotation, thereby arcuately translating the third axis on rotation of the crank and displacing the actuator mechanism.
6. A rack and pinion steering gear as claimed in claim 5 wherein the axis of rotation  
30 of the crank is fixed with respect to the housing.
7. A rack and pinion steering gear as claimed in claim 5 wherein rotation of the crank is effected by a servomotor.

8. A rack and pinion steering gear as claimed in claim 4 wherein the linkage incorporates an overload mechanism which causes a shortening or lengthening of the distance between the second and third axes when the axial load exerted on the linkage exceeds the predefined value.

9. A rack and pinion steering gear as claimed in claim 4 wherein the third axis is defined by the rotational centre of a journal bearing, needle roller bearing or ball bearing connecting the linkage to the crank.

10. A rack and pinion steering gear as claimed in claim 1 wherein the second axis is defined by the rotational centre of a journal bearing, needle roller bearing or ball bearing connecting the intermediate gear to the linkage.

11. A rack and pinion steering gear as claimed in claim 1 wherein the relationship comprises varying the rack gain, and the parameter is the steering wheel angle or the speed of the vehicle.

12. A rack and pinion steering gear as claimed in claim 1 wherein the relationship comprises the generation of an additional lateral displacement of the rack, and the parameter is the magnitude of side load applied to the vehicle due to cross wind disturbances or road camber.

13. A rack and pinion steering gear as claimed in claim 1 wherein the intermediate gear comprises two subgears relatively angularly displaceable about the central axis of the intermediate gear and urged by a spring preloading mechanism to minimize mesh backlash between the intermediate gear and the pinion, and between the intermediate gear and the rack.